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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/801,235

03/16/2004

James W. Fuller

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2027

26096

7590

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CARLSON, GASKEY & OLDS, P.C.
400 WEST MAPLE ROAD
SUITE 350
BIRMINGHAM, MI 48009

EXAMINER

PHAM, THOMAS K

ART UNIT

PAPER NUMBER

2121

DATE MAILED: 03/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/801,235

Applicant(s)

FULLER, JAMES W.

Examiner

Thomas K. Pham

Art Unit

2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13, 15, 16, 18 and 19 is/are rejected.
- 7) ☒ Claim(s) 12, 14 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

First Action on the Merits

1. Claims 1-19 of U.S. Application 10/801,235 filed on 03/16/2004 are presented for examination.

Quotations of U.S. Code Title 35

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Drawings

6. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because indication of hand writing on the drawing. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Objections

7. Claim 1 is objected to because of the following informalities: line 1 after “control system” missing a descriptive word such as “comprising” or “including”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. Claims 1-11, 13, 15, 16, 18 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication 2005/0007249 (“Eryurek”).

Regarding claim 1

Eryurek teaches a model predictive control system

- a plurality of sensors indicating a current state of the system (see paragraph 96);
- a desired trajectory generator for creating a desired dynamic response based upon commands (see paragraph 151);

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- a model of plant dynamics starting with the current state of the system, a nonlinear programming module receiving the desired dynamic response and at least one system life goal and formulating a problem of achieving the desired dynamic response and the at least one system life goal for a window spanning one or more time steps as a solution to a nonlinear program problem using methods of model predictive control (see paragraph 170); and
- a nonlinear programming solver solving the nonlinear programming problem in each time step using an iterative algorithm based upon the model predictive control problem and a nonlinear programming algorithm (see paragraph 197).

Regarding claim 7

Eryurek teaches a method for controlling a multivariable system including the steps of:

- a) receiving a plurality of sensor signals indicating current conditions of the system (see paragraph 96);
- b) receiving a plurality of commands (see paragraph 151);
- c) receiving at least one system life goal (see paragraph 166);
- d) determining a desired dynamic response of the system based upon the commands (see paragraph 197); and
- e) implementing a balance between the desired dynamic response and the at least one system life goal in a model predictive controller to generate a plurality of actuator commands (see paragraph 170).

Regarding claim 19

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Eryurek teaches a computer readable medium storing a computer program, which when executed by a computer performs the steps of:

- a) receiving a plurality of sensor signals indicating current conditions of the system (see paragraph 96);
- b) receiving a plurality of commands (see paragraph 151);
- c) receiving at least one system life goal (see paragraph 166);
- d) determining a desired dynamic response of the system based upon the commands (see paragraph 197); and
- e) implementing a balance between the desired dynamic response and the at least one system life goal in a model predictive controller to generate a plurality of actuator commands (see paragraph 170).

Regarding claim 2

Eryurek teaches the at least one system life goal includes at least one limit (see paragraph 112).

Regarding claim 3

Eryurek teaches the plant dynamic model and limit equation are linear and the performance index is quadratic so as to form a quadratic programming problem and the nonlinear programming solver is replaced with a quadratic programming solver (see paragraphs 197 and 199).

Regarding claim 4

Eryurek teaches the at least one system life goal changes based upon a change in a status signal (see paragraph 79).

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Regarding claim 5

Eryurek teaches the status signal is generated by a sensor (see paragraph 92).

Regarding claim 6

Eryurek teaches the status signal indicates the status of an actuator (see paragraph 92).

Regarding claim 8

Eryurek teaches said step e) is performed by weighting in a performance index for the model predictive controller (see paragraph 168).

Regarding claim 9

Eryurek teaches the step of changing the balance between the desired dynamic response and the at least one system life goal (see paragraph 170).

Regarding claim 10

Eryurek teaches the step of changing the weighting in the performance index to change the balance (see paragraph 153).

Regarding claim 11

Eryurek teaches the step of changing the weighting based upon an indication of a failure of a component in the system (see paragraph 169).

Regarding claim 13

Eryurek teaches the step of setting a limit in a set of inequality equations for the model predictive controller (see paragraph 170).

Regarding claim 15

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15. The method of claim 13 further including the step of changing the limit based upon an indication of a failure of a component in the system or the declaration of an emergency (see paragraph 169).

Regarding claim 16

Eryurek teaches the step of setting a limit in a set of inequality equations for the model predictive controller (see paragraph 170).

Regarding claim 18

18. The method of claim 16 further including the step of changing the limit based upon an indication of a failure of a component in the system or the declaration of an emergency (see paragraph 169).

Allowable Subject Matter

9. Claims 12, 14 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner *Thomas Pham*; whose telephone number is (571) 272-3689, Monday - Thursday from 6:30 AM - 5:00 PM EST or contact Supervisor *Mr. Anthony Knight* at (571) 272-3687.

Any response to this office action should be mailed to: **Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450**. Responses may also be faxed to the **official fax number (571) 273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas Pham
Patent Examiner

A handwritten signature in black ink, appearing to read 'Tom Pham', with a stylized flourish at the end.

February 21, 2006